STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

ESTABLISHMENT OF GUIDELINES FOR PROTECTION OF THE SPORT FISH RESOURCES DURING LAND USE ACTIVITIES

by

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ABSTRACT

The Land Use Project has completed its fifth year of cooperative work with the U.S. Forest Service. Project personnel participated in Interdisciplinary Team (IDT) surveys of 15 watersheds on North Chichagof Island and the Alecks Lake system on Kuiu Island. After the field surveys were completed, written recommendations were submitted to the U.S. Forest Service indicating potential detrimental effects of logging and associated activities on fish habitat and sport fishing values. These recommendations included specific areas within the watershed to be avoided because of the presence of critical rearing or spawning areas, stream bank or channel instability, unstable soils, or potential sedimentation problems. The employment of windfirm buffer strips was recommended for some of these areas. Recommendations also included estuarine areas, where log dumpsites would be undesirable, and preferred locations for stream crossing sites and fisherman access trails. One entire watershed, the Mud River-Otter Lake system, was recommended to be deferred from logging because of its high fishing, aesthetic, and recreational values.

In order to evaluate the effectiveness of recommendations resulting from IDT surveys, logging areas are periodically resurveyed. The North Thorne River sale area on Prince of Wales Island and Bear Creek on Mitkof Island were resurveyed this field season. For each of the two areas, five recommendations have been submittted to the U.S.F.S. following the initial IDT surveys. These recommendations included avoidance of areas with unstable soils, minimization of road construction along streams, protection of stream banks and bottoms by felling and yarding trees away from the streams, location of a bridge site, construction of a fisherman access trail, evaluation of two falls on the North Thorne River for possible improvement measures, and maintenance of the visual

quality around Snakey Lakes near the North Thorne River. The resurv indicated that two recommendations were effective, five were only partially effective, two were tentatively effective, and one had not been tested. In addition, culvert installations were inspected in bo areas and minnow traps were used to determine whether various culvert constituted barriers to fish passage. Results of these tests were inconclusive.

BACKGROUND

The current Land Use Project originated in 1970 as a job titled "Effec of Logging on Dolly Varden." Emphasis of the study included determini the prelogging status of fish populations in Hood Bay Creek, and monitoring prelogging fish populations of seven additional streams within the Hood Bay watershed on Admiralty Island (Armstrong and Reed, 1971).

The second year of study included general surveys of logged streams throughout Southeast Alaska, aquatic insect surveys, monitoring prelogging fish populations on eight streams within the Hood Bay watershed, and compiling an annotated bibliography on the effects of logging on fish (Reed and Elliott, 1972). After this study was completed several recommendations concerning the future direction of this project were made. These recommendations included the following:

> The overall effects of land use activities on all sport fish species should be studied and efforts should be focused in two areas.
>
> 1. Efforts should be made to provide technical assistance to the U.S. Forest Service during prelogging surveys and to participate in presenting educational programs to loggers covering methods of protecting small streams during logging operations.
>
> 2. The effects of land use activities on rearing fish habitat should be studied by finding methods of making reliable population estimates of rearing fish; and determining abundance, distribution, and species of aquatic insects.

Following the recommendations made in 1972 the study titled "A Study of Land Use Activities and Their Relationship to the Sport Fish Resources in Alaska" was established in 1973. This study included two jobs: "Establishment of Guidelines for Protection of Sport Fish Resources During Logging Operations," and "Ecology of Rearing Fish." The first job emphasized the importance of serving as members of Forest Service multidisciplinary teams on prelogging surveys, designating important sport fishing waters in Southeast Alaska, presentation of educational programs at logging camps, and publication of a pamphlet on logging and its effect on fish habitat (Elliott and Reed, 1973). The pamphlet served as the first vehicle for establishing guidelines for the U.S.F.S. and logging operators.

The job titled "Establishment of Guidelines for Protection of Sport Fish Resources During Logging Operations" completed in 1974 paralleled the previous years' efforts with continued emphasis on cooperation with the U.S. Forest Service during prelogging surveys. Recommendations, based on field observations, were made on methods of protecting the sport fish resources during logging operations. Also, one evaluation survey was carried out on a logging area which had received a prelogging survey. No major problems were found. Efforts were also extended to provide assistance to the Alaska Department of Natural Resources during their land-use planning of the Haines-Skagway areas. Educational programs were presented to specific groups upon request (Elliott and Reed, 1974).

The same job title "Establishment of Guidelines for Protection of Sport Fish Resources During Logging Operations" was retained for the study completed in 1975. Again emphasis was placed on cooperation with the U.S. Forest Service Multi-Disciplinary Team (MDT) efforts in the Tongass National Forest. Resulting recommendations followed operational guidelines listed in the pamphlet "Logging and Fish Habitat" (U.S. Forest Service, Alaska Department of Fish and Game, Alaska Department of Natural Resources, 1973) employing leave strips in braided-channel areas, along erosion prone stream banks, and for maintaining aesthetics in important angling locations; locating bridges and roads where sediment introduction into streams would be minimized; and locating log dump sites where the chemical and physical impacts on shellfish, schooling salmon, and impacts on high-use recreational areas would be reduced.

The Pavlof, Mud Bay, and Karta-Salmon Lake systems were submitted to the Habitat Section of the Department of Fish and Game as areas where logging should be deferred because of outstanding sport fishing values.

Recommendations were also provided to the Department of Natural Resources regarding the Haines/Skagway Land-use Management Study. The study emphasized a multi-use philosophy, favoring public cabins over private cabins and a reduction in size of clear cut units.

Also, efforts continued in the area of presentation of educational programs on logging and fish habitat to the public (Dinneford and Elliott, 1975).

The job title for the work completed in 1976 was modified slightly to reflect the increasing scope of the studies and reads, "Establishment of Guidelines for Protection of the Sport Fish Resources During Land Use Activities." The program continued its cooperation with the U.S. Forest Service in MDT studies. This year these studies focused on 22 freshwater systems in the Yakutat forelands. A rating system for the evaluation of fish habitat and angling opportunity was developed and applied to the systems surveyed. Resulting recommendations included no development in 10 systems, development under certain constraints in five systems and development with a minimum of negative disturbance in seven systems.

Resurveys in previously studied areas were conducted at logged watersheds at Corner Bay, North Kuiu Island, and Naukati Bay. Evaluations were made concerning (1) the implementation of Sport Fish Division recommendations, (2) the effectiveness to these recommendations, and (3) the

general impression regarding stream crossings and streamside logging. Of the 29 recommendations made originally, 11 were considered ineffecti 10 were considered effective and 8 were inconclusive (Dinneford and Elliott, 1976).

In 1976 the U.S. Forest Service introduced the "Draft Tongass National Forest Guide" which includes the following statement: "This draft guid is the initial step in redefining the goals and policies for managing the Tongass National Forest." Some of the goals and policies included in this "draft guide" reflect the efforts of this project in the area of fish habitat protection.

Hopefully, the continuing efforts of project personnel will insure adequate protection of fish habitat and will preserve the many excellent sport fishing areas in Southeast Alaska.

RECOMMENDATIONS

Research

1. Land use biologists should continue to identify waters important to the sport fish resources and provide recommendations to protect this resource during land use activities. Cooperation with the U.S. Forest Service is required and should be accomplished by:

    a. Participation in the development of the Tongass Land Management Plan so that important sport fishing areas will receive proper consideration during the land use allocation process.

    b. Participation in the production of the Tongass Guide to insure that guidelines necessary for the protection of sport fish resources are included.

    c. Participation in IDT prelogging surveys and resurveys so that important fish habitat can be identified and conflicts between land use activities and fisheries resources may be resolved.

2. Technical assistance should be provided to the Department of Natural Resources in land use planning on State lands by surveying watersheds prior to land use activities, advising the Department of Natural Resources of the guidelines necessary to protect sport fish resources, and cooperating with the Department of Natural Resources throughout the land planning process.

3. Efforts should be made to develop and employ a compatable rating system which will reflect the relative sport fish values of the waters of Southeast Alaska.

4. Evaluation of the effectiveness of recommendations and guidelines made available to land managing agencies should be continued.

5. Efforts to inform industry and the public of the importance of fish habitat should be continued.

Management

Because of the increasing numbers of people and increasing accessiblity to formerly remote areas in conjunction with increasing land use activities, efforts should be initiated to assess and regulate the impacts upon the sport fish resources in affected areas. In particular, impacted areas could be examined in the following ways:

1. Identify sport fishing areas accessible to residents of major oil, mining, and logging camps, and measure the harvest of sport fish in areas receiving major impacts.

2. Identify sport fish resources accessible to the Alaska Marine Highway and connecting road systems, and measure the harvest of sport fish in areas receiving major impacts.

OBJECTIVES

1. To designate waters important to the sport fish resources and make recommendations to protect this resource during land use activities.

2. To determine the effectiveness of recommendations and guidelines made available to the land managing agencies.

3. To advise industry and the public of the importance of fish habitat and the methods needed to protect this habitat during land use activities.

TECHNIQUES USED

Initial Surveys

Two major areas were surveyed during this field season: fifteen streams on North Chichagof Island, and the Aleck's Creek system on Kuiu Island. These studies served as Sport Fish input into the MDT (Multi-Disciplinary Team, also referred to as IDT, Inter-Disciplinary Team) approach to land use planning (U.S. Forest Service, Alaska Department of Fish and Game, and Alaska Department of Natural Resources, 1973).

The information gathered using this approach measures physical parameters, angling potential, and biological productivity of the systems studied. Specifically, project biologists examined stream systems aerially and on foot. Individual observations, rod-and-reel sampling, and fry traps were utilized to determine fish species present, relative abundance, and angler potential.

During the surveys inch-to-the-mile topographic maps and hand made sketches were used to indicate (1) fragile areas displaying major or potential erosion problems, (2) spawning areas and major rearing habitats, (3) barriers to fish migration (if present) and (4) outstanding sport fishing areas.

Stream temperatures, water flows, pool-to-riffle ratios, and general observations of other physical parameters were indicated throughout the course of the surveys.

After field work was completed, data were compiled, analyzed, and copies were submitted to each of the disciplines involved in the IDT activities; recommendations were then made (relative to proposed land use activities) to protect sport fish values during planned land use activities.

Resurveys

After an initial IDT survey has been completed, areas subjected to land use activities are periodically revisited in order to evaluate the effectiveness and appropriateness of the initial recommendations. Also, specific problems associated with road construction and logging activities that have caused damage to fisheries habitat in the past are closely scrutinized.

Two areas were resurveyed during this field season, the North Thorne River sale area on Prince of Wales Island and the Bear Creek logging area on Mitkof Island.

FINDINGS (Initial Surveys)

North Chichagof IDT Surveys - Results

During August and September of 1976 a total of 15 watersheds were surveyed for sport fish values on North Chichagof Island. Surveys were accomplished during a cooperative effort with the U.S. Forest Service planning team from Sitka working on the 1981 to 1986 ALP 5-year plan.

Basic stream inventories were performed on the following systems in order to make recommendations to reduce impact during logging operations.

Of the 15 watersheds surveyed, Mud Bay Creek-Otter Lake, Wukuklook Creek, and Game Creek should provide excellent sport fishing opportunities. Suntaheen Creek, Gartina Creek, Tenakee Inlet Head-Creek, Gallagher Creek, Chicken Creek, and Trail River may offer fair to good angling opportunities; and the remaining systems appeared to be of minimal importance for sport fishing. Survey findings are as follows:

Freshwater Bay head-creek (112-50-32):

This stream, flowing from the northwest into the head of Freshwater Bay, is low in sport fish populations as well as angling opportunities. A few adult Dolly Varden, Salvelinus malma, were observed during the foot survey, and at least 250 pink salmon were observed in the creek with more off the mouth. The stream averages 18 feet wide and 11 inches deep. Pools are relatively shallow (pool/riffle ratio = 1:20) and sandy bottomed. Invertebrate food forms appeared to be low in numbers. An excellent anchorage is located south of the mouth of the stream just north of the small peninsula above Freshwater Creek.

Seal Creek (112-50-38):

Seal Creek is located on the north shore of Freshwater Bay, approximately 3 miles from the head of the bay. With an average depth of 14 inches and a width of 53 feet, the stream flows from alpine country through a steep, timbered valley to salt water. Though Seal Creek is a fine pink, Oncorhynchus gorbuscha (Walbaum), and chum, O. keta (Walbaum), producer for its accessible length (1,700 pinks were estimated in 1 1/4 miles), it is not a prime sport fishing stream. The lower 1/4 mile of the stream is easily walked, but windfalls impede progress for the next 3/4 mile. Steep valley walls make walking difficult in the upper reaches. Numerous, deep pools are associated with wind throws in the lower reaches of the stream and in a bedrock area at the base of a 25 foot vertical falls. This waterfall is located 1 1/4 mile above the mouth of the stream and constitutes a barrier to anadromous fish migration. Invertebrates, especially caddis flies, are common along the mainstream.

Gypsum Creek (112-12-46):

Gypsum Creek flows parallel to Freshwater Bay and enters Chatham Strait 1 mile north of the Iyoukeen Peninsula. It is a clear, moderate sized stream flowing approximately 35 cfs in the upstream section surveyed. This is not a high-value angling system. Dolly Varden were found up to the base of the falls 3 miles upstream. The pool/riffle ratio is low (1:20). Close to the mouth, angling is likely to be the most successful. A 6 foot vertical falls at the head of the bedrock cascade section may be an effective block to all migrating salmonids. Below the cascades the streambed is characterized by good spawning material of gravel and cobble.

Wukuklook Creek (112-12-50):

Wukuklook Creek, which enters Chatham Strait between False Bay and Iyoukeen Cove, is a clearwater productive fish stream bordered by scenic 2,500 foot mountains. At least 4 1/2 miles of stream are accessible to coho, O. kisutch (Walbaum), pink and chum salmon, Dolly Varden char and rainbow trout, Salmo gairdneri Richardson. A series of cascades at this point may block upstream movement, though this was not observed.

The stream averages 37 feet wide, 8 inches deep and has a stream bed composed of gravel and rubble up to 10 inches in diameter. The pool/riffle ratio was estimated to be 1:20, the pools having gravel bottoms and averaging 5 feet deep. These pools present excellent angling opportunities. Visibility is excellent as is access along gravel bars and the streamside.

Wukuklook Creek offers the best freshwater sport fishing of the streams between Freshwater Creek and Spasski Creek, however, boat anchorage near the mouth is poor.

Iyouktug Creek (112-13-06):

Entering False Bay is Iyouktug Creek, approximately 7 miles long. The stream flow is approximately 50 c.f.s. and drains a considerable amount

Excellent stands of large spruce, highly desirable for timber harvest, are located in an area of unstable soils and steep stream banks. If this area is clearcut, special techniques may have to be considered to prevent slides and sedimentation. The streambed of the creek appeared to be composed of a high percentage of silt and sand. Bedload shifting could therefore prove hazardous to developing salmonid eggs.

Access through the land held by the Mt. Bether community at the mouth of Game Creek could be a problem for private parties. Because of high fish values, high game values, and potential landslide sediment problems, Game Creek should receive consideration for special protective measures.

Seagull Creek (114-32-04):

Seagull Creek, draining into the southeastern side of Port Frederick is a low value system in terms of sport fishing opportunities. The accessible 2 1/2 miles is characterized by a small number of pools and many riffles composed of spawnable-size gravel, sand and bedrock. Most of the pools are associated with wind-thrown trees, often making angling difficult. Pink and chum salmon were observed.

Seagull Creek has wide gravel bars, and devil's club and conifers grow right to the banks. However, a large number of trees in the creek indicate some bank cutting. Banks are less stable at the barrier falls, 2 1/2 miles upstream. Stream banks up to 100 feet high were found and landslides in this area were numerous. Development should be planned to avoid the steep sections of this stream.

Little Goose Creek (112-48-23):

Little Goose Creek is of low importance for sport fish angling and rearing potential. Pink and chum salmon were present in small numbers, and negligable numbers of adult Dolly Varden were seen. No coho, rearing or adult, were observed.

Little Goose Creek is a cold, swift stream. Water temperature was 6°C, and aquatic invertebrates were seldom observed. Access was difficult because of swift current and dense growth of alder, conifer, and cottonwood along the stream margin. This system, like other Tenakee Inlet streams, is highly braided, with active channel changes occurring.

Tenakee Inlet and its Head Stream (112-48-35):

The head stream of Tenakee Inlet is cool (6°C) and rapidly flowing. Recreational fishing opportunities are present, but of moderate value. Four good pools that offered good char fishing were found in the 2 1/2 mile survey distance. Stream side progress is slow and difficult because of dense alder and willow along the lower reaches, and swift, deep water upstream. An outstanding feature of the stream is an exceptional rearing habitat for juvenile coho--a beaver dam/slough complex located in the grass flats near the mouth.

of muskeg lands, making the water dark brown. An aerial survey showed no total blocks but many windfalls across the stream channels. Foot access would be difficult where the channels are braided and covered with these downed trees. Fish use of Iyouktug may be light, since no activity was noticed off the intertidal zone. Coloration of the water made instream observations difficult. Sport fish appeal of this system is considered lower than others in this area.

Suntaheen Creek (114-27-15):

This creek flows into Whitestone Harbor on the northeast corner of Chichagof Island. It drains a timbered muskeg and is colored light brown. It is 6.5 miles long, 50 feet wide and 7.5 inches deep, and flows at an approximate rate of 45 cfs. Access is easy from the mouth to at least 1 1/2 miles upstream. A section of windfalls has to be negotiated about 1/2 mile upstream. Angling potential below a partial barrier falls at the upstream end of the foot survey is good for a small system. Pools 6 to 8 feet deep with gravel or bedrock bottoms were well spaced, each with a concentration of Dolly Varden as well as pink and chum salmon. The barrier falls drops approximately 5 feet vertically over bedrock and is probably not a block to either Dolly Varden or coho. Whitestone Harbor offers good anchorage in its northern bight. Crabbing is good within the harbor and a good coho trolling area has been reported outside the harbor.

Gartina Creek (114-31-09):

This system enters Port Frederick near Hoonah and part of it is included in Hoonah's Native Withdrawal Claim. It is 45 feet wide, with an 8 inch deep flow, and is clear in color. A fair pool/riffle complex, with 6 foot deep pools and good spawning areas is interrupted by a 50-foot waterfall, 3 1/2 miles above the mouth. Evidence of an old flume, probably used in a past mining operation, was noticed at this bedrock falls.

Angling for Dolly Varden was fair just below the falls; one 14 inch fish was taken in 15 minutes of fishing. Hoonah residents were observed fishing near the mouth of Gartina Creek but their catch was not determined. Although this stream is readily accessible from the town of Hoonah, its inclusion in Native Withdrawal Claims may prevent use by the general public.

Game Creek (114-31-13):

Game Creek is an excellent system in that it provides good spawning, rearing habitat and angling areas. Rearing coho were found up to 11 miles above the mouth, and an additional 3 miles of stream were accessible to anadromous fish. Adult chum salmon and Dolly Varden were seen 11 miles upstream. Pools for fishing were found along the entire stream, especially in the lower 6 mile stretch. Pools up to 12 feet wide were interrupted by lengths of excellent spawning riffles. At least 15 Dolly Varden in the 1 to 2 pound class and one 16 inch cutthroat were caught during the survey.

Gallagher Creek (114-27-55):

Gallagher Creek runs into Icy Strait just west of Port Frederick. It drains a considerable amount of muskeg and is colored light brown with an estimated discharge of 60 c.f.s. at normal levels. Access for chum, pink, and coho salmon, and Dolly Varden char is good for 4 miles, but is blocked at this point by a waterfall over bedrock. Fisherman access is fair through braided channels in the lower 2 miles of stream, but steep banks and a narrow valley hinder progress further upstream. Spawning potential is fair in the lower 1/2 mile, with a streambed composed of 3 inch gravel and sand. Upstream, the streambed is often composed of boulder, bedrock, and gravel with little spawning area available. Pools are deep but murky (1:20 pool/riffle ratio) and tributaries are small, steep and coffee colored because of muskeg runoff. Sport fishing values are low throughout this system.

Chicken Creek (114-23-35):

Chicken Creek is a clear stream that averages 35 feet wide and 17 inches deep at normal flows. It enters Icy Strait half way between Port Frederi and Mud Bay. Walking is easy for 4 miles, but a cascade and an 8 foot barrier falls hinder further progress. Wide gravel bars and several massive cutbanks in the lower mile and a half, attest to heavy flooding in this system. A large land slide has deposited an estimated 8 to 10 thousand cubic yards of silt, gravel and boulders along the north side of the main stream. This slide area is near the second tributary upstream from the mouth of Chicken Creek (not shown on USGS map). The streambed in the lower 3 1/2 miles is gravel, cobble and sand. Pools, suitable for angling, are most common at the upper end of the accessible stream. Only two pools were found in the lower mile of stream, which is primarily braided riffle. Coho fry were commonly observed, and chum, pink and Dolly Varden were present in fair numbers. Numerous aquatic insects were observed.

Mud Bay River (114-23-70):

Mud Bay River and Otter Lake were surveyed in 1974 in conjunction with the 1976-1981 ALP 5-year cutting plan. At that time the recommendation was made to defer or eliminate any logging in the drainage. This request is reemphasized at this time.

Mud Bay River area offers some of the finest outdoor recreation on northern Chichagof Island. The watershed has an excellent sport fishery with aesthethic qualities provided by a view of Glacier Bay across Icy Strait. Angling for Dolly Varden is excellent. Fish taken by rod and reel averaged 2 to 3 pounds. Larger fish, probably about 5 pounds, were seen frequently. Populations of Dolly Varden were estimated at 2,000 to 5,000 in the lower 2 miles. Otter Lake also has a good population with two anglers reportedly taking 10 fish in 45 minutes. Reports that sockeye, O. nerka (Walbaum), and sea-run cutthroat, Salmo clarki Richardson use Otter Lake were not confirmed, but one cutthroat was observed near the tide flats.

Excellent fishing for Dolly Varden, the impressive tide flats, and picturesque views of Glacier Bay make this a watershed of high value. For this reason, the Division of Sport Fish recommends no logging in the watershed. In addition, the State of Alaska has recommended Mud Bay River for LUD (Land Use Designation) I or II classification in the Tongass Land Management Plan. If the watershed is designated for timber harvest, cutting should be done in such a manner that recreational fisheries values will be preserved.

Trail River (114-40-35):

The aesthethics of Idaho Inlet and Trail River are of high quality, and foot access is excellent along the lower 2 miles of stream. However, the stream does not appear to be an excellent fish producer. The temperature is cold (6°C) and insect fauna observed was sparse. This stream is probably more valuable as a pink and chum salmon producer, although some Dolly Varden were taken with rod and reel. Fish values may be only moderate for a system of this size.

No barriers were seen during an aerial survey, but a foot survey revealed that the upper end of Trail River cascades over large cobbles and boulders, forming a block to fish passage. In the lower end, the streambed is a mixture of sand and 3-inch gravel. This section appears stable, with alder, willow and spruce growing on the banks. The upper end of the stream is very braided. Judging by the amount of heavily-used trails, Trail River has a healthy population of bears feeding on chum and pink salmon.

North Chichagof IDT Surveys - Recommendations

1. Freshwater Bay and its head creek: In order to minimize conflicts with commercial and sport vessels, the anchorage at the head of Freshwater Bay should not be used as a log dumpsite.

   If a crossing is necessary on the head creek, the preferred location is at the upper end of the cascades 1 1/2 miles from the mouth. This is an area of bedrock and should pose few sediment problems.

2. Seal Creek: Because of unstable soils, Seal Creek is considered a high risk area and should not be considered for logging. If logging or road construction is necessary, the landslide area 1/2 mile upstream from the mouth should be avoided.

3. Gypsum Creek: There are two landslide areas, one about 1 mile upstream and the other about 2 1/4 miles upstream, which should be avoided during land use activities. Also if stream crossing is necessary, braided areas should be avoided.

4. Wukuklook and Iyouktug creeks: If stream crossings are necessary on these creeks, braided areas should be avoided and attempts should be made to locate areas of firm bedrock.

5. Whitestone Harbor and Suntaheen Creek: Because it offers good crab habitat, schooling areas for pink and chum salmon, and excellent anchorages, Whitestone Harbor should not be used as a log dumpsite.

If a stream crossing is necessary on Suntaheen Creek, the preferred site is at the falls about 1 1/2 miles from the mouth. This is a bedrock area and should provide a stable construction site.

6. Gartina Creek: Any crossing on this creek should be made above the falls, where the stream gradient is relatively low, or in an area well below the canyon falls, where the stream is stable.

7. Game Creek: Because steep banks and numerous slides indicate stream bank instability, no logging or road construction should be permitted near the stream from about 1 1/2 miles above the mouth to approximately 4 miles above the mouth. Also, because of the high percentage of silt and sand throughout this system, a thorough analysis of potential bedload shifting in regard to damage of salmonid eggs should be conducted prior to activities in this watershed.

8. Seagull Creek: If stream crossings are necessary, they should be located well below the unstable canyon area beginning about 2 miles upstream from the mouth. Also, no logging or road construction should be permitted near the canyon falls area.

9. Little Goose Creek: Because of unstable stream banks, severe braiding, and the evident scouring action, road construction and logging activities should be kept away from the outside margins of the stream channels.

10. Head Creek of Tenakee Inlet: The beaver-formed rearing habitat at the mouth of the stream should be protected by allowing no road or other construction near its margins.

11. Chicken Creek: Stream crossing sites in this area should be selected with care because of braiding and cutbanks in the lower 1 1/2 miles of the stream and the landslide prone valley about 2 1/2 miles upstream. A possible crossing site is at a bedrock gorge between the end of the cutbanks and the start of the slide area about 2 miles upstream from the mouth.

12. Mud Bay River and Otter Lake: This system is included in the list of "Quality Watersheds of Southeast Alaska." In order to ensure retention of fishery, aesthetic and recreational values, the previously made recommendation to defer or eliminate logging in this watershed is reemphasized at this time.

13. Trail River: The upper heavily braided areas along this stream should be avoided if stream crossing sites are necessary.

Alecks Creek Stream Survey Results

On August fifth and seventh, 1976, a foot survey was made of the Alecks Creek watershed on Kuiu Island. Approximately 7 1/2 miles of stream and lake accessible to anadromous fish flows into Elena Bay on the north end of larger Tebenkof Bay. Approximately 5 1/2 miles of this distance was

surveyed by foot to observe the Alecks Creek/Lake system and make recommendations for the protection of fish habitat and angling potential.

The west fork of Alecks Creek averaged 48 feet wide and 9 inches deep; the east fork above the lake was 34 feet wide and 8 inches deep. The mainstream of both forks was clear and supported heavy moss growth, while tributaries were light brown due to muskeg drainage. Tributaries in the east fork above Alecks Lake were especially suited for rearing salmonids, with low to moderate velocities, overhanging vegetation and/or undercut banks, and an abundance of caddis flies and other invertebrate food forms.

The west fork flows through a narrow canyon with walls up to 120 feet high, beginning a mile above the forks. Banks of the east fork up to 3 1/2 miles above the lake are level and afford easy walking. Walking along the lower lake is more difficult. Big spruce and hemlock are common above the lake, and a grove of large cedar was found on the lake's northwest shore. Many locations suitable for back country camping were found along the lake and stream.

About one-half mile of the east fork was dry except for occasional small pools, all filled with rearing coho. This appears to be a temporary condition as the stream was flowing well above this point. Channels are braided in this stretch, the main fork, and the west fork and show evidence of fluctuating water levels.

The estuary of Alecks Creek is rich in Fucus growth and growths of Zostera. Several thousand pink fry were observed near the creek mouth. A subsistence crab pot caught from two to six legal male dungeness crabs daily for five days. The best angling locations were found below the forks, in the lower "lake", and at the upper end of the lake. A boat is needed to fish the upper end, however, littoral vegetation was light enough to allow casting from shore.

Alecks Creek Stream Survey - Recommendations

The following recommendations are made to protect the Alecks Lake and Creek system in the event of future development in the area:

1. All braided sections of the stream channel should be avoided during any road construction or logging operations. No bridges should be planned for these braided areas. Windfirm leave strips along such areas, as prescribed by Forest Service specialists, should be employed to further protect stream stability.

2. Tributaries in the Alecks Creek system should have buffer strips left along them to protect their rearing capabilities. Especially for the 25-foot wide stream approximately 3 miles above the lake, flowing from the northeast. Such buffer strips will protect fragile overhanging banks.

3. Any roads planned in this system should be located above the main forks and above the grassy meadow at the upper end of the lake to

block the visual impact of activity from the lake and lower creek. This would provide a screen for the most productive angling waters of the system. If roads are planned in the watershed, trail access to the lake would be desired. Roads should be kept 1/4 mile from the lake.

4. No camps or dumps should be allowed at the mouth of Alecks Creek. The estuarine area is a rich shellfish producer and nursery area and should therefore be kept free of development.

FINDINGS (Resurveys)

North Thorne River - Results

On May 14 and 15, 1976, Steve Haavig and Bruce Dinneford conducted evaluations of the North Thorne River sale area. This resurvey followed initial I.D.T. planning by Sport Fish biologists in 1972. A summary of initial recommendations and action taken are compared below.

Evaluation of Initial Recommendations:

Five recommendations were made by the Sport Fish Division to the U.S.F.S. after field work in June of 1972. For each, the original recommendation will be listed, then any applicable guidelines included in the Forest Service Planning unit report, and finally the findings during our resurvey.

1. Sport Fish Recommendation:

   Portions of stream channels approaching valley walls should be deferred from logging if soils are found to be unstable.

   Forest Service Guideline:

   "Defer two areas where mainstream channels lie at foot of valley walls on unstable soils," (guideline #16).

   Resurvey Findings:

   Both east fork and west fork are bisected by access roads. The west fork road was not open because of loading operations in progress. The east fork is very braided near the road. This condition existed prior to road construction, but construction so close to the stream could trigger channel shifting. The road passes within 40 feet of the stream for approximately 400 feet.

   While logging has not occurred in the area requested to be deferred, a road has been constructed near this section of unstable stream and the initial recommendation has only been partially effective.

2. Sport Fish Recommendation:

   Road construction along streams should be kept to a minimum to reduce sedimentation.

Forest Service Guideline:

"Protect stream banks and tributaries during logging. No logging across identified fish streams." (guideline #17).

Resurvey Findings:

Most of the road observed during the resurvey did not parallel streams but crossed at right angles. Notable exceptions were the east branch of the east fork (mentioned above) and culvert number five on echo spur. While fish were not documented here, the stream runs parallel to the road, in gutter fashion, for 300 feet. This is believed to be a non-fish stream.

Culvert number one was the only definite fish stream with evidence of logging across it. Approximately 350 feet of stream is covered with debris from an older operation. Slash may be blocking the movement of Dolly Varden since fish were trapped up to a point about 100 feet below the culvert, but none were found above the culvert. No natural barriers were observed from the culvert to where fish were trapped.

3. Sport Fish Recommendation:

Falls should be checked at various flows for evaluation of stream improvement project.

Forest Service Guideline:

"Study feasibility of blasting resting pools on falls of west fork (guideline #18)."

Resurvey Findings:

Forest Service R.M.A. Fred Ziegler and fishery biologist Bill Parr remarked that the falls on the east fork of the North Thorne were examined for stream improvement. This stream was not felt to be of high enough priority to warrant such attention.

Evidently the west fork falls have not been similarly surveyed. The original Sport Fish recommendation is thus partially effective.

4. Sport Fish Recommendation:

If logging occurs along main forks or its tributaries, fell and yard trees away from streams to protect stream banks and bottom.

Forest Service Guideline:

"Protect stream banks and tributaries during logging. No logging across identified fish streams (guideline #17)."

Resurvey findings:

This point is covered under 2 above. At least one fish stream was felled into and probably yarded across. The other three streams, littered with logging debris, feed larger streams and there is a potential for transport and introduction of sediment.

Despite recommendations, fish streams and non-fish feeder streams still incur logging debris deposition and are frequently being logged across.

5. Sport Fish Recommendation:

Defer logging areas visible from Snakey Lakes until techniques are developed which will eliminate visual disturbance.

Forest Service Guideline:

"The south facing slope of the major landform north of Snakey Lakes is to be deferred from cutting during the first entry; the south face of the landform separating the two main forks is to be given full landscape management considerations (guidelines #1 and #2)."

Resurvey Findings:

The landform between the forks of the North Thorne River is currently being logged to approximately the 800 foot level in what appears to be conventional clearcut methods. It is not known if this cut will be visible from the Snakey Lakes. However, the cut was not visible from the West Spur near the Snakey Lakes.

No cutting was observed on the major landform north of the Snakey Lakes. The recommendation is considered effective during the first entry.

Evaluation of Culverts:

Five culverts (Table 1) were examined to determine their ability to carry water without impeding fish passage. The culverts were selected on the basis of the stream having enough flow to serve as fish habitat and, having a gradient that would not act as a blockage to fish movement. A sixth culvert was included to note a potential sedimentation problem and "culvert number 0" is a location where a culvert should have been used.

Fry trapping did not conclusively show that the culverts were blocks to fish movement. Culvert number three was well constructed and had no drop, yet no fish were captured above the culvert. Culvert number two had a small drop of 3 cm, and one Dolly was captured above. Neither culvert was considered a block to movement.

Table 1. Evaluation of Culverts in the Thorne River Watershed, 1976.

Culvert Number	Length of Trap Set	Catch Above Culvert	Catch Below Culvert	Description of Conditions
1	18.0 hours	0	0	3 cm drop, some scouring.
2	3.5 hours	0	1 D.V.	3 cm drop, no scouring.
3	13.5 hours	4 D.V.	0	No drop, silt & sand deposited to sides of culvert, 4 cm scour in front of culvert.
4	Non-fish stream	Not trapped		Loose rock and gravel on bank of stream capable of silt problems.
5	2.0 hours	0	0	10 cm drop. Slash and logs in stream just below culvert.
6	No set made			200 to 300 feet of channel that has been felled into and yarded across.
0	18.0 hours	0 (above road)	8 D.V. (below road)	No culvert here. Road has impounded stream.

Additional Observations:

Items not specifically identified during initial surveys were noticed during the resurvey. A list of these follows.

1. The "first creek bridge" on the west spur has no brow logs. In addition the sill logs of the bridge are laying in the water the entire length of the bridge. Since this may become a permanent bridge both these situations should be corrected.

2. The North Thorne River bridge on the west spur is encroaching on the river channel. The sill logs of the bridge rest in the water and constrict the flow of the river causing bank erosion on the downstream side.

3. The bridge on the east fork of the north Thorne River is well designed. Sill logs are located on the bank and the flow is constricted only to a minor degree.

4. While the Fiddler Creek bridge has brow logs, the space between them and stringer logs is great enough to permit introduction of fill material.

Bear Creek - Results

On May 26 and 27, a resurvey of Bear Creek, Mitkof Island, logging area was conducted. Referred to as Bear Creek #2 by the U.S. Forest Service, it covers an area initially surveyed by Steve Elliott in 1972.

While initial Sport Fish recommendations were given for streams in each cutting unit, Forest Service guidelines were general for all streams. Two of the "management recommendations and restraints" from the July 1974 Environmental Analysis Report, applied to sport fish values.

Sport Fish Recommendations:

1. Fall and yard trees away from stream B-8 in Unit #1. Yard trees away from B-9; if feasible, yard across rather than parallel to the channel.

2. Fall and yard trees away from stream B-7 in Unit #2.

3. Fall and yard trees away from streams B-10 and B-11 in Unit #3. Place bridge giving access to unit #3 below confluence of B-10 and B-11 to eliminate multiple crossings.

4. Fall and yard trees perpendicular to stream channels on all feeder streams in Units #4, #6, #7, and #8.

5. Construct fisherman access trail between system and spur road bridges, as well as upstream from the spur road bridge and downstream from system road bridge, for approximately 1 mile in each direction.

Forest Service Guidelines:

1. Field mark all fish streams and water courses needing protection. Mark all streams that need protection on the sale area map.

2. Remove the complex of two log stringer bridges crossing Bear Creek and a small rearing stream before the Bear Creek #2 timber sale is closed. These bridges were constructed during a previous timber sale.

Resurvey Findings:

No definite blocks to the movement of anadromous fish were found. Potential for sediment introduction was found in many non-fish streams.

In cutting Unit #1 five log culverts were observed, four of which had either trees and slash across the streams or sidecast material that may pose a sedimentation problem. All streams so affected are non-fish streams. Since felling is currently 150 feet away from stream B-8, the recommendation to fell and yard away from that stream cannot be evaluated at this time.

In Unit #2 stream B-7 is crossed with a 45-foot bridge above the portion of the stream inhabited by rearing fish. Both stream banks above the bridge are sloughing into the stream, contributing to the downstream sedimentation. Also, 12 inch gaps are found between the brow and stringer logs which may allow road gravel to be introduced into the stream.

No cutting has occurred along stream B-7 except for the road right of way. To date, stream B-7 has not been felled across. Sport Fish Recommendation #2 is tentatively effective.

Unit #3 was not entered due to heavy truck traffic and road construction. Logging has not begun in this unit yet. As requested, the bridge crossing stream B-10 was placed below the junction with B-11 (personal communication, operator Richard Duval, May 27, 1976). The recommendation regarding felling away from B-10 and B-11 is only tentatively effective.

Along the road towards Unit #3, three log culverts were observed south of the road leading to Units #1 and #2 that were carrying heavy sediment loads. Each of these small creeks ran as "gutters" along the spur road and were being muddied by the truck traffic. The flow continued towards stream B-10. In the future, recommendations should be made to keep from channelizing stream flows along roadsides.

No haul road has been built into Unit #4 so evaluation is impossible.

Stream B-2 enters Bear Creek just upstream from the system road bridge. The stream parallels the road for approximately 200 feet; roughly 125 feet of this distance has had road fill introduced into the stream causing at least 50 feet of channel shifting. A fry trap set near Bear

Creek caught two cutthroat and one Dolly Varden, and a trap 300 feet upstream (within the altered section) produced nothing.

In cutting Unit #6 five non-fish streams were observed (flows of 5-10 cfs) that were equipped with log culverts. Where most log culverts have a log on either side of the stream and are covered by a series of logs running perpendicular to the channel, these were made of three logs, two along the stream and one on top of those two. While the channel was intact on all of these streams under the culvert, four of the five had side-cast material and/or logs and slash in the channel directly downstream from the culvert. The recommendation asking for felling and yarding perpendicular to the stream may be effective, but the chance for sedimentation is high.

Five log culverts were found in cutting Unit #7, built like those in Unit #6. The flows of these non-fish streams is approximately 1-5 cfs. All five had sediment associated problems. Either the lower logs were in the stream flow, there was sidecast material and/or vegetative debris in the channel on the downstream end, or road fill (gravel or anchor rock) was found in the channel on one or both sides of the culvert.

In cutting Unit #8, five perpendicular-type log culverts were found, two of which were passing water. On both of these, sidecast earth and stumps were found in the channel on the downstream end.

The spur road up to cutting Units #9 and #10 was under construction at the time of the survey with about 1/4 mile completed. No streams were crossed in that distance.

Unit #6 was the only cutting unit of #6, #7 and #8 where falling was in progress (except for the road right-of-way) at the time of the survey. At least 1,500 feet of stream has logs felled into the channel. Yarding all these logs out of the streams will contribute to erosion and bank destruction. The recommendation for this cutting unit was ineffective.

Erling Husvig, R.M.A. for Bear Creek #2, reported that a trail will be built from the system road to the three lakes system, located outside the sale area. If time and money permit, at least part of the proposed trail along Bear Creek will be built. The recommendation is considered effective.

Culvert Evaluation:

Four round steel culverts (Table 2) were analyzed in the Bear Creek watershed for their ability to pass rearing anadromous fish. Since no definite anadromous fish were trapped, the results of the analysis are inconclusive. Two culverts were found with Dolly Varden and cutthroat trout both above and below them, one was found with Dolly Varden above the culvert and nothing below, and one was found to have cutthroat below the culvert and nothing above.

Summary of the Effectiveness of Sport Fish Recommendations

North Thorne River - Recommendations:

Table 2. Evaluation of Culverts in the Bear Creek Watershed, 1976.

Culvert Number	Length of Trap Set	Catch Above Culvert	Catch Below Culvert	Description of Conditions
1	17 hours	10 D.V. 2 C.T.	3 D.V. 2 C.T.	72" diameter, 18" drop in two falls (rock halfway in falls). Culvert large enough for flow but not low enough in stream.
2	4 hours	4 D.V.	0	36" diameter, 14" drop.
3	3 hours	1 D.V.	2 D.V. 1 C.T.	6' squash culvert with 2' drop. Scour pool 15' x 15' x 4' deep.
4	3 hours	0	1 C.T.	36" diameter, 16" drop.

1. Portions of stream channels approaching valley walls should be deferred from logging if soils are found to be unstable.

2. Road construction along streams should be kept to a minimum to reduce sedimentation.

3. Falls should be checked at various flows for evaluation of stream improvement project.

4. If logging along main forks or its tributaries, trees should be felled and yarded away from the stream to protect the stream banks and bottom.

5. Logging of areas visible from Snakey Lakes should be deferred until techniques are developed that will eliminate visual disturbance.

Effectiveness:

1. Partial (road along stream)

2. Partial (two streams with road alongside)

3. Partial (east fork falls examined, but not west fork falls)

4. Partial (four streams contain logging debris)

5. Effective (no cuts visible yet)

Bear Creek - Recommendations:

1. Fell and yard trees away from stream B-8 in Unit #1. Yard trees away from B-9; if infeasible, yard across rather than to the channel.

2. Fell and yard trees away from B-7 in Unit #2.

3. Fell and yard trees away from streams B-10 and B-11 in Unit #3. Place bridge giving access to Unit #3 below confluence of B-10 and B-11 to eliminate multiple crossings.

4. Fell and yard trees perpendicular to stream channels on all feeder streams in Units #4, #6, #7, and #8.

5. Construct fisherman access trail between the system and spur road bridges as well as upstream from the spur road bridge and downstream from the system road bridge for approximately 1 mile in each direction.

Effectiveness:

1. Inconclusive because of logging progress (sedimentation problems noted)

2. Tentatively effective

3. Tentatively effective (bridge recommendation - effective)

4. Partially effective (logs felled into three streams in Unit #6) (sedimentation problems noted)

5. Effective

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